

**CALL TRIGGERING TO ONE OR MORE SERVICE NODES UPON RECEIPT OF
INITIAL TRIGGER RESPONSE**

CROSS-REFERENCE TO RELATED APPLICATIONS

This application contains subject matter that is related to the subject matter of the
5 following applications, which is assigned to the same assignee as this application. The
below-listed applications are hereby incorporated herein by reference in their entirety.

“MOBILE STATION ORIGINATION WHEN SERVING MOBILE SWITCHING
CENTER IS NOT WIRELESS INTELLIGENT NETWORK CAPABLE,” by Batni, et al.,
Serial No. 10/253,090, filed September 24, 2002.

10 “GENERATING ONE OR MORE TRIGGERED OPERATIONS TO PREPAID
SERVICE NODE BASED ON CONNECTION WITH INTELLIGENT PERIPHERAL
COMPONENT,” by Batni, et al., Serial No. 10/736,256, filed December 15, 2003.

TECHNICAL FIELD

The invention relates generally to communications and more particularly to
15 originating mobile switching center interaction with service nodes.

BACKGROUND

In a telecommunication network, a user associated with a prepaid mobile
communication device may fund an account balance employable for subsequent
telecommunication service. For example, the telecommunication network provides the
20 prepaid mobile communication device with prepaid telecommunication service. A prepaid
service node maintains the account balance for the prepaid mobile communication device.
For example, the prepaid service node calculates billing information for telecommunication
service used by the prepaid mobile communication device. The billing information in one
example comprises an amount to deduct from the account balance associated with the prepaid

mobile communication device. The prepaid mobile communication device in one example is connected with a destination location on a telephone call for a duration. The prepaid service node calculates the amount to deduct from the account balance based on the destination location and duration of the telephone call.

5 The telecommunication network may offer additional services in addition to supporting telephone calls. For example, the telecommunication network may offer directory information, weather reports, horoscopes, and/or stock quotes through connection with one or more service nodes. The telecommunication network in one example connects mobile communication devices to the service nodes upon receipt of specific dialed number strings
10 from the mobile communication devices.

 The telecommunication network in one example comprises a serving mobile switching center responsible for triggering calls to the service nodes. However, the serving mobile switching center may not be able to support call triggers. Thus, to trigger calls to the service nodes, the serving mobile switching center may pass control of the call to an
15 originating mobile switching center that supports call triggers. The originating mobile switching center connects the mobile communication device with the service nodes.

 In one example, the originating mobile switching center triggers the call to one or more of the service nodes. However, the originating mobile switching center does not receive a trigger address list from a home location register upon registration of the mobile
20 communication device. As one shortcoming, the originating mobile switching center may not have a complete list of call triggers required to connect the mobile communication device with the service nodes.

 In another example, one or more of the service nodes hairpin (e.g., bridge) the call. For example, to connect the call with a service node, the originating mobile switching center
25 connects a first call leg with the service node. The service node connects a second call leg

back to the originating mobile switching center to continue the call. The service node bridges the first and second call legs together. The service node remains in a path of the call for a duration of the call. As another shortcoming, each of the call legs consume telecommunication network resources for the duration of the call.

5 Thus, a need exists for a telecommunication network that provides an enhanced communication between service nodes.

SUMMARY

The invention in one embodiment encompasses an apparatus. The apparatus comprises an originating mobile switching center that handles one or more calls. A serving
10 mobile switching center for a communication device on a call of the one or more calls passes control of the call to the originating mobile switching center. The originating mobile switching center triggers the call to a service node. The service node sends an initial trigger response to the originating mobile switching center that instructs the originating mobile switching center to redirect the call. The initial trigger response arms one or more triggers
15 that support one or more services for the communication device. The one or more triggers comprise one or more of one or more switch based triggers and one or more subscriber based triggers exclusive of Calling_Routing_Addresss_Available, OAnswer, and ODisconnect triggers. Upon receipt of the initial trigger response, the originating mobile switching center encounters one or more of the one or more triggers and triggers the call to one or more other
20 service nodes.

Another embodiment of the invention encompasses a method. Control of a call is received from a serving mobile switching center. The call is triggered to a service node that employs an initial trigger response to arm one or more triggers. The one or more triggers comprise one or more of one or more switch based triggers and one or more subscriber based
25 triggers exclusive of Calling_Routing_Addresss_Available, OAnswer, and ODisconnect

triggers. One or more of the one or more triggers associated with one or more other service nodes is encountered. The call is triggered to one or more of the one or more other service nodes upon receipt of the initial trigger response.

Yet another embodiment of the invention encompasses an article. The article
5 comprises one or more computer-readable signal-bearing media. The article comprises means in the one or more media for receiving control of a call from a serving mobile switching center. The article comprises means in the one or more media for triggering the call to a service node that employs an initial trigger response to arm one or more trigger. The one or more triggers comprise one or more of one or more switch based triggers and one or
10 more subscriber based triggers exclusive of Calling_Routing_Addresss_Available, OAnswer, and ODisconnect triggers. The article comprises means in the one or more media for encountering one or more of the one or more triggers associated with one or more other service nodes. The article comprises means in the one or more media for triggering the call to one or more of the one or more other service nodes upon receipt of the initial trigger
15 response.

DESCRIPTION OF THE DRAWINGS

Features of exemplary implementations of the invention will become apparent from the description, the claims, and the accompanying drawings in which:

FIG. 1 is a representation of an exemplary implementation of an apparatus that
20 comprises one or more originating mobile switching centers, one or more serving mobile switching centers, one or more service nodes, one or more mobile communication devices, one or more home location registers, and one or more public switched telephone networks.

FIG. 2 is a representation of one exemplary message flow for transfer of control of a call from a serving mobile switching center of the one or more serving mobile switching

centers to an originating mobile switching center of the one or more originating mobile switching centers of the apparatus of FIG. 1.

FIG. 3 continues where FIG. 2 ended and is a representation of one exemplary message flow for triggering a call to a directory assistance service node of the one or more service nodes of the apparatus of FIG. 1.

FIG. 4 continues where FIG. 3 ended and is a representation of one exemplary message flow for a connection of a prepaid mobile communication device of the one or more mobile communication devices with a location associated with destination digits received from a directory assistance service node of the one or more service nodes of the apparatus of FIG. 1.

FIG. 5 is a representation of one exemplary message flow that may optionally occur between the message flows of FIGS. 2 and 3 for triggering a call to a voice activated dialing service node of the one or more service nodes of the apparatus of FIG. 1.

DETAILED DESCRIPTION

Turning to FIG. 1, an apparatus 100 in one example comprises one or more originating mobile switching centers (“O-MSCs”) 102, one or more serving mobile switching centers (“S-MSCs”) 104, one or more service nodes 106, 108, and 109, one or more mobile communication devices 110, one or more home location registers (“HLRs”) 112, and one or more public switched telephone networks (“PSTNs”) 114. The apparatus 100 illustrates a use of mobile switching center and other wireless network element (e.g., the home location register 112) operations, in accordance with, and in addition to American National Standards Institute (“ANSI-41”) and Wireless Intelligent Network (“WIN”) standards, to provide a charging capability for transactions with the service nodes 106, 108, and 109.

The originating mobile switching center 102 handles one or more calls. For example, the originating mobile switching center 102 supports call delivery for the mobile communication device 110. The serving mobile switching center 104 supports an air interface with the mobile communication device 110. The originating mobile switching center 102 serves to connect the mobile communication device 110 with one or more termination endpoints during a communication session. In one example, the originating mobile switching center 102 connects the mobile communication device 110 with the public switched telephone network 114. In another example, the originating mobile switching center 102 connects the mobile communication device 110 with one or more of the service nodes 106, 108, and 109.

The serving mobile switching center 104 in one example passes control of a call to the originating mobile switching center 102. For example, the serving mobile switching center 104 hotlines the call to the originating mobile switching center 102. The serving mobile switching center 104 in one example does not support call triggers and the originating mobile switching center 102 does support call triggers for the call. Thus, to allow call triggering for connections with the service nodes 106, 108, and 109, the serving mobile switching center 104 transfers control of the call to the originating mobile switching center 102.

The service nodes 106, 108, and 109 in one example each comprise an intelligent peripheral component ("IP") and a service control point ("SCP"). The service nodes 106, 108, and 109 in one example provide services to the mobile communication device 110. The services of the service nodes 106, 108, and 109 in one example may be combined or divided. For example, one or more service platforms may host the services of the service nodes 106, 108, and 109.

The service node 106 in one example comprises a prepaid service node 106. The mobile communication device 110 may incur a fee during use of the service nodes 108 and

109 and the prepaid service node 106 may bill the mobile communication device 110 for using the services. To facilitate billing the mobile communication device 110 for use of the services, the service nodes 106, 108, and 109 send service identifications that are associated with the service nodes 106, 108, and 109 to the originating mobile switching center 102 to
5 indicate the use of the services during a communication session. The originating mobile switching center 102 will store the service identifications for later delivery to the prepaid service node 106.

If the originating mobile switching center 102 receives a service identification that does not match a prearranged value, then the originating mobile switching center 102 will
10 record the service identification in automatic message accounting ("AMA") records. Thus, the originating mobile switching center 102 compiles a list of all received service identifications during the communication session. Then, the originating mobile switching center 102 may later send the list of received service identifications to the prepaid service node 106. The list of received service identifications is employable by the prepaid service
15 node 106 to calculate billing information based on use of the service nodes 108 and 109 by the mobile communication device 110. For example, the service nodes 108 and 109 may thus communicate the service identifications to the prepaid service node 106 without requiring the service nodes 108 and 109 to know which subscribers are prepaid subscribers.

The prepaid service node 106 handles billing for services used by the mobile
20 communication device 110 during a communication session. The prepaid service node 106 employs the service identifications, billing rates, and call durations to calculate billing information for the communication session. The billing information in one example comprises an amount to deduct from an account balance associated with the mobile communication device 110. The prepaid service node 106 in one example sends service

identifications to the originating mobile switching center 102 to indicate a service provided to the mobile communication device 110.

The service nodes 108 and 109 provide one or more services to the mobile communication device 110 during a communication session. The service node 108 in one example provides one or more of a directory assistance service (e.g., 411 service), a horoscope service, a weather report service, a stock quote service, and the like. In one example, the service node 108 comprises a directory assistance service node 108 that provides directory assistance service to the mobile communication device 110. In one example, the service node 109 comprises a voice activated dialing service node 109 that provides voice activated dialing service to the mobile communication device 110.

In one example, the directory assistance service node 108 provides directory assistance services as well as additional services. For example, the directory assistance service node 108 may support the horoscope service, the weather report service, and the stock quote service. The directory assistance service node 108 in one example employs a different service identification for each of the supported services to be able to indicate use of a plurality of the services. For example, the directory assistance service node 108 sends one or more different service identifications to the originating mobile switching center 102 to indicate which of the supported services were used by the mobile communication device 110 on the communication session. Thus, the originating mobile switching center 102 can pass the one or more different service identifications to the prepaid service node 106 for billing the mobile communication device 110.

The mobile communication device 110 in one example comprises a prepaid mobile communication device. For example, the prepaid mobile communication device 110 comprises a mobile telephone with an associated prepaid telephone service account. The prepaid telephone service account comprises an account balance used to fund subsequent

telecommunication service. The home location register 112 stores subscription properties for the prepaid mobile communication device 110. Upon registration of the prepaid mobile communication device 110 with the serving mobile switching center 104, the home location register 112 communicates one or more portions of the subscription properties to the serving
5 mobile switching center 104. The serving mobile switching center 104 employs the subscription properties for communication session setup.

Referring to FIGS. 1-2, an illustrative description of one exemplary operation of the apparatus 100 is now presented, for explanatory purposes. A message flow 201 represents an exemplary transfer of control of a call from the serving mobile switching center 104 to the
10 originating mobile switching center 102. The message flow 201 also illustrates the originating mobile switching center 102 triggering the call to the prepaid service node 106.

Upon registration of the prepaid mobile communication device 110 with the serving mobile switching center 104, the serving mobile switching center 104 sends a registration notification message 202 to the home location register 112. "REGNOT" serves to represent
15 the registration notification message 202. The home location register 112 determines that the prepaid mobile communication device 110 employs prepaid telecommunication service. The home location register 112 also determines that the serving mobile switching center 104 does not support call triggers for the call. Thus, the home location register 112 in one example does not arm call triggers at the serving mobile switching center 104.

20 The home location register 112 sends a registration notification return result message 204 to the serving mobile switching center 104. "Regnot" serves to represent the registration notification return result message 204. The home location register 112 sets the destination digits in the registration notification return result message 204 to pass control of the call to the originating mobile switching center 102. For example, the home location register 112
25 sets the destination digits to "HOTLINE." Thus, upon attempt to setup a call from the

prepaid mobile communication device 110, the serving mobile switching center 104 sends the call to the originating mobile switching center 102. This effectively passes control of the call from the serving mobile switching center 104 to the originating mobile switching center 102.

Upon an origination 206 of a call by the prepaid mobile communication device 110,
5 the serving mobile switching center 104 sends the call to the originating mobile switching center 102. For example, the user of the prepaid mobile communication device 110 dials “XXX” to initiate the call. “OCN = XXX” serves to represent a dialed digit string to initiate the call. In one example, the dialed digit string comprises “411” to initiate a call to the directory assistance service node 108. The serving mobile switching center 104 initiates a
10 call setup 208 with the originating mobile switching center 102. For example, the serving mobile switching center 104 hotlines the call to the originating mobile switching center 102.

The call setup 208 comprises an indication to the originating mobile switching center 102 to trigger the call to the prepaid service node 106. For example, the originating mobile switching center 102 encounters a Specific_Calling_Party_Digit_String (“SCPDS”) trigger in
15 response to the call setup 208. The originating mobile switching center 102 sends an AnalyzedInformation operation 210 to the prepaid service node 106 to involve the prepaid service node 106 on the call.

To determine subscriber properties associated with the prepaid mobile communication device 110, the prepaid service node 106 sends a search operation 211 to the home location
20 register 112. The search operation 211 requests a TriggerAddressList from the home location register 112. The home location register 112 sends a search operation return result 212 to the prepaid service node 106. The search operation return result 212 comprises the TriggerAddressList. The TriggerAddressList in one example comprises Origination_Attempt_Authorized (“OAA”), Calling_Routing_Addresss_Available
25 (“CgRAA”), OAnswer, Odisconnect, and All_Calls triggers. For example, the search

operation return result 212 indicates to the prepaid service node 106 to arm one or more subscriber based triggers at the originating mobile switching center 102.

In one example, the call setup 208 doesn't include the dialed digit string (e.g., "OCN = XXX"). So, upon receipt of the search operation return result 212, the prepaid service node 106 sends a ConnectResource message 213 to the originating mobile switching center 102. The ConnectResource message 213 causes a bearer channel (e.g., voice trunk) to be set up and is used to gain potentially lost information, such as the dialed digit string, or to obtain additional information, such as a personal identification code. The prepaid service node 106 in one example may perform the search operation 211 and the ConnectResource message 213 contemporaneously.

Upon receipt of the ConnectResource message 213, the originating mobile switching center 102 initiates a call setup 214 to the prepaid service node 106. The call setup 214 to the prepaid service node 106 in one example checks to see if the account balance associated with the prepaid mobile communication device 110 has a sufficient balance to fund the call. If additional time is necessary for the connection between the prepaid service node 106 and the originating mobile switching center 102, then the prepaid service node 106 may send a ResetTimer 216 to the originating mobile switching center 102. The ResetTimer 216 in one example allows another thirty seconds for the connection.

Upon receipt of the call setup 214, the prepaid service node 106 sends an initial trigger response 218 to the originating mobile switching center 102. The initial trigger response 218 in one example comprises an anyzsd return result message that indicates to the originating mobile switching center 102 to redirect the call. For example, the originating mobile switching center 102 interprets the initial trigger response 218 to be a redirection request for redirection of the call to the directory assistance service node 108. The initial trigger response 218 comprises a digit string associated with the directory assistance service

node 108. For example, the initial trigger response 218 comprises a termination list ("Termlist") set to "411PAY." Thus, upon receipt of a call with the termination list of "411PAY," the directory assistance service node 108 knows the call is from a prepaid subscriber, such as the prepaid mobile communication device 110.

5 The prepaid service node 106 employs the initial trigger response 218 to arm one or more triggers at the originating mobile switching center 102. For example, the triggers may comprise one or more switch based triggers and/or one or more subscriber based triggers. The subscriber based triggers in one example comprise one or more of Origination_Attempt_Authorized, Collected_Information, and Analyzed_Information
10 triggers. For example, the subscriber based triggers are detected at the Origination_Attempt_Authorized, Collected_Information, and Analyzed_Information detection points. The originating mobile switching center 102 in one example encounters one or more of the subscriber based triggers prior to encountering a Calling_Routing_Addresss_Available trigger.

15 The one or more triggers support one or more services for the prepaid mobile communication device 110. For example, the one or more triggers allow the call to be sent to the directory assistance service node 108 to provide directory assistance service to the prepaid mobile communication device 110. In one example, the initial trigger response 218 comprises the termination list. For example, the termination list arms one or more switch
20 based triggers at the originating mobile switching center 102. In another example, the initial trigger response 218 comprises a TriggerAddressList. The TriggerAddressList in one example comprises Calling_Routing_Addresss_Available, OAnswer, Odisconnect, and All_Calls triggers. For example, the initial trigger response 218 arms one or more subscriber based triggers at the originating mobile switching center 102. The initial trigger response 218
25 may comprise a service identification to indicate the involvement of the prepaid service node

106 on the call. "ServiceID1" serves to represent the service identification associated with the prepaid service node 104.

Referring to FIGS. 1 and 3, a message flow 301 represents an exemplary triggering of the call to the directory assistance service node 108. The message flow 301 continues where
5 the message flow 201 (FIG. 2) ended. For example, the originating mobile switching center 102 has received the redirection request, for example, the initial trigger response 218 (FIG. 2) and the call is ready to be setup to the directory assistance service node 108.

Upon receipt of a digit string associated with the directory assistance service node 108 in the redirection request, the originating mobile switching center 102 triggers the call to the
10 directory assistance service node 108. For example, the originating mobile switching center 102 encounters a dialed digit trigger based on the digit string. Upon encountering the dialed digit trigger, the originating mobile switching center 102 sends an AnalyzedInformation operation 302 to the directory assistance service node 108.

Upon receipt of the AnalyzedInformation operation 302, the directory assistance
15 service node 108 sends a ConnectResource message 304 to the originating mobile switching center 102. The ConnectResource message 304 indicates to the originating mobile switching center 102 to setup a temporary connection with the directory assistance service node 108. The ConnectResource message 304 comprises a service identification to indicate to the originating mobile switching center 102 that the directory assistance service node 108 was
20 involved on the call. "ServiceID=2" serves to represent the service identification associated with the directory assistance service node 108.

Since the initial trigger response 218 (FIG. 2) armed the CgRAA trigger, upon receipt of the ConnectResource message 304, the originating mobile switching center 102 sends an AnalyzedInformation operation 306 to the prepaid service node 106. For example, the

originating mobile switching center 102 encounters a CgRAA trigger and sends the AnalyzedInformation operation 306 to the prepaid service node 106.

The AnalyzedInformation operation 306 communicates to the prepaid service node 106 that a call is being set up to the directory assistance service node 108. The
5 AnalyzedInformation operation 306 comprises DestinationDigits so that the prepaid service node 106 may calculate rating for the call to the directory assistance service node 108. The AnalyzedInformation operation 306 passes a service identification (e.g., ServiceID=127) to the prepaid service node 104 to distinguish the intelligent peripheral call from a standard call.

Upon receipt of the AnalyzedInformation operation 306, the prepaid service node
10 104 sends an analyzd return result message 308 to the originating mobile switching center 102 to allow the call to continue to the directory assistance service node 108. The originating mobile switching center 102 will then set up a call 310 to the digits of the directory assistance service node 108 specified in the ConnectResource message 304. The directory assistance service node 108 answers the call 310 and interacting with the calling party of the prepaid
15 mobile communication device 110 will locate a telephone number based on an inquiry from the user of the prepaid mobile communication device 110. “(XXX) XXX-XXXX” serves to represent the telephone number.

Since the initial trigger response 218 (FIG. 2) armed the OAnswer trigger, after the call 310 is answered, the originating mobile switching center 102 sends the OAnswer trigger
20 message 312 to the prepaid service node 106. The OAnswer trigger message 312 communicates to the prepaid service node 106 that the call to the directory assistance service node 108 has been answered. The OAnswer trigger message 312 passes the ServiceID=127 to the prepaid service node 106 to distinguish the intelligent peripheral call from a standard call.

If additional time is necessary for the connection with the directory assistance service node 108, the directory assistance service node 108 may send a ResetTimer 314 to the originating mobile switching center 102. The ResetTimer 314 allows another thirty seconds for the connection between the originating mobile switching center 102 and the directory assistance service node 108. The ResetTimer 314 comprises a service identification to indicate to the originating mobile switching center 102 that the ResetTimer 314 was activated for the connection with the directory assistance service node 108. "ServiceID=3" serves to represent the service identification associated with the ResetTimer 314 and can also be used to identify an additional service provided to the prepaid mobile communication device 110. For example, the prepaid mobile communication device 110 may receive a horoscope before requesting for directory assistance from the directory assistance service node 108.

The directory assistance service node 108 interacts with the prepaid mobile communication device 110 over the call 310, as needed, by sending multiple ResetTimer analogous to the ResetTimer 314. Upon completion of the interactions, the directory assistance service node 108 sends a DisconnectResource message 316 to the originating mobile switching center 102. The DisconnectResource message 316 serves to release the connection between the originating mobile switching center 102 and the directory assistance service node 108. The DisconnectResource message 316 may comprise one or more service identifications that indicate to the originating mobile switching center 102 services used by the prepaid mobile communication device 110. "ServiceID=4" serves to represent the one or more service identifications.

Since the initial trigger response 218 (FIG. 2) armed the Odisconnect trigger, upon encountering the Odisconnect trigger, the originating mobile switching center 102 sends an Odisconnect trigger message 318 to the prepaid service node 106. The Odisconnect trigger message 318 communicates to the prepaid service node 104 that the call to the directory

assistance service node 108 has been disconnected. The Odisconnect trigger message 318 passes the ServiceID=127 to the prepaid service node 104 to distinguish the intelligent peripheral call from a standard call.

The originating mobile switching center 102 includes the service identifications in the
5 Odisconnect trigger message 318 to the prepaid service node 106. The Odisconnect trigger message 318 sends an indication of the services used by the prepaid mobile communication device 110. For example, the Odisconnect trigger message 318 may comprise one or more of ServiceID=1, Service ID=2, ServiceID=3, and ServiceID=4. The prepaid service node 106 employs the service identifications to calculate billing information based on the use of the
10 one or more service nodes 106, 108, and 109 by the prepaid mobile communication device 110. The Odisconnect trigger message 318 may indicate one or more billing parameters, such as, the service identifications, one or more billing rates, and one or more call durations. For example, the Odisconnect trigger message 318 may provide an indication to the prepaid service node 106 of a duration of the connections with the directory assistance service node
15 108. The prepaid service node 106 calculates an amount to deduct from an account balance associated with the prepaid mobile communication device 110.

The prepaid service node 106 sends an Odisconnect return result 320 to the originating mobile switching center 102 to allow the call to continue at the originating mobile switching center 102. In response to the inquiry from the user of the prepaid mobile
20 communication device 110, the directory assistance service node 108 sends an anylzd return result message 322 to the originating mobile switching center 102. The anylzd return result message 322 comprises an indication of the telephone number (XXX) XXX-XXXX. The anylzd return result message 322 closes the transaction started by the AnalyzedInformation operation 302. The anylzd return result message 322 comprises parameters to change the
25 destination digits, thereby redirecting the call to the telephone number (XXX) XXX-XXXX.

Referring to FIGS. 1 and 4, a message flow 401 represents an exemplary connection of the prepaid mobile communication device 110 with a location associated with the destination digits received from the directory assistance service node 108. The message flow 401 continues where the message flow 301 (FIG. 3) ended. For example, the transaction with the directory assistance service node 108 has ended and the call is ready to be setup to the destination digits (XXX) XXX-XXXX.

In order to charge every call, the CgRAA trigger is armed at the originating mobile switching center 102 for delivery to the prepaid service node 106. The CgRAA trigger message 402 comprises routing information parameters, such as the destination digits (XXX) XXX-XXXX. The prepaid service node 106 employs the routing information parameters to properly rate the call. For example, the prepaid service node 104 employs the routing information parameters to calculate billing information associated with the call. The CgRAA trigger message 402 gives the prepaid service node 106 control of the call.

Once the prepaid service node 106 gains control of the call, the prepaid service node 106 may send a ConnectResource message 404 to the originating mobile switching center 102. The ConnectResource message 404 directs the originating mobile switching center 102 to set up a temporary connection to the prepaid service node 106. The connection with the prepaid service node 106 provides the prepaid mobile communication device 110 with customized balance announcements and interactions.

In one example, upon receipt of the ConnectResource message 404, the originating mobile switching center 102 sends a CgRAA trigger message 406 to the prepaid service node 106. The prepaid service node 106 sends an analyzed return result message 408 to the originating mobile switching center 102 to allow the originating mobile switching center 102 to continue the call. In another example, the originating mobile switching center 102 determines to not send the CgRAA trigger message 406. For example, the originating mobile

switching center 102 may determine to not send the CgRAA trigger message 406 because the CgRAA trigger message 406 would be communicating information already known by the prepaid service node 106 back to the prepaid service node 106.

To determine whether to send the CgRAA trigger message 406, the originating
5 mobile switching center 102 in one example compares the TAL destination for the CgRAA trigger that was received in the initial trigger response 218 (FIG. 2) and the address for the trigger that encapsulates the CgRAA trigger message 406. For example, the originating mobile switching center 102 compares an address associated with a received service identification and a trigger destination address for a destination to send the received service
10 identification. If the address associated with the service identification is the same as the trigger destination address, then the originating mobile switching center 102 determines to not send the service identification to the trigger destination address. If the trigger address of the a trigger matches the TriggerAddress of the trigger as armed in the TAL, then the originating mobile switching center 102 does not send the trigger to the TriggerAddress.

15 To connect with the prepaid service node 106, the originating mobile switching center 102 sets up a call 410 to the prepaid service node 106. For example, the prepaid service node 106 plays prepaid pre-call announcement balance and account options for the prepaid mobile communication device 110 through the originating mobile switching center 102. After the call 410 is answered, the originating mobile switching center 102 encounters the OAnswer
20 trigger. The originating mobile switching center 102 sends an OAnswer trigger message 412 to the destination provisioned in the initial trigger response 218 (FIG. 2). For example, the originating mobile switching center 102 sends the OAnswer trigger message 412 to the prepaid service node 106. The OAnswer trigger message 412 communicates to the prepaid service node 106 that the call 410 has been answered.

If additional time on the connection with the prepaid service node 106 is necessary, the prepaid service node 106 may send a ResetTimer 414 to the originating mobile switching center 102. The ResetTimer 414 provides another thirty seconds for the ConnectResource message 404 connection. Also, the ResetTimer 414 may also be sent with a ServiceID to
5 indicate use of an additional service by the prepaid mobile communication device 110.

After the call 410 to the prepaid service node 106 is disconnected, then the originating mobile switching center 102 encounters the ODisconnect trigger. The originating mobile switching center 102 sends an ODisconnect trigger message 416 to the prepaid service node 106. The ODisconnect trigger message 416 communicates to the prepaid service node 106
10 that the call to the prepaid service node 106 has been disconnected. Any service identifications received at the originating mobile switching center 102 during the connection with the prepaid service node 106 are sent to the prepaid service node 106 in the ODisconnect trigger message 416. For example, the ODisconnect trigger message 416 comprises ServiceID=127 so that the prepaid service node 104 can bill for the service associated with
15 ServiceID=127. If the OAnswer trigger message 412 and the ODisconnect trigger message 416 are communicating information from the prepaid service node 106 through the originating mobile switching center 102 and back to the prepaid service node 106, then the originating mobile switching center 102 could avoid sending the OAnswer trigger message 412 and the ODisconnect trigger message 416.

20 Upon receipt of the ODisconnect trigger message 416, the prepaid service node 106 sends an Odisconnect return result 418 to the originating mobile switching center 102 to allow the call to continue at the originating mobile switching center 102. The prepaid service node 106 is done playing announcements for the prepaid mobile communication device 110. Thus, the prepaid service node 106 sends an anylzd return result message 420 to the
25 originating mobile switching center 102. The anylzd return result message 420 closes the

transaction with the prepaid service node 106 started by the CgRAA trigger message 402. The anlyzd return result message 420 may comprise parameters to affect the service identifications recorded in the AMA record of the originating mobile switching center 102.

The anlyzd return result message 420 returns control of the communication session to
5 the originating mobile switching center 102. The originating mobile switching center 102 sets up a call 422 to the location associated with the destination digits (XXX) XXX-XXXX. For example, the originating mobile switching center 102 sends the call 422 out to the public switched telephone network 114. The public switched telephone network 114 delivers the call to a location associated with the destination digits (XXX) XXX-XXXX. Once the call
10 422 is answered, the originating mobile switching center 102 sends an Oanswer trigger message 424 to the prepaid service node 106. Once the call 422 is disconnected 426, the originating mobile switching center 102 sends an ODisconnect trigger message 428 to the prepaid service node 106. The Oanswer trigger message 424 and the Odisconnect trigger message 428 allow the prepaid service node 106 to charge for the call 422 to (XXX) XXX-
15 XXXX. Upon receipt of the Odisconnect trigger message 428, the prepaid service node 106 sends an Odisconnect return result message 430 to the originating mobile switching center 102 to end the triggered transactions.

Referring to FIGS. 1 and 5, a message flow 501 represents an exemplary triggering of the call to the voice activated dialing service node 109. The message flow 501 continues
20 where the message flow 201 (FIG. 2) ended. For example, the originating mobile switching center 102 has received the redirection request, for example, the initial trigger response 218 (FIG. 2) and the call is ready to be triggered to the voice activated dialing service node 109.

In one example, the originating mobile switching center 102 triggers call to the voice activated service node 109 prior to triggering the call to the directory assistance service node
25 108. For example, the call is triggered to the voice activated service node 109 and the user of

the prepaid mobile communication device verbally requests connection to the directory assistance service node 108. Thus, the message flow 501 in one example may occur between the message flow 201 (FIG. 2) and the message flow 301 (FIG. 3). Upon receipt of the initial trigger response 218 (FIG. 2), the originating mobile switching center 102 encounters the
5 All_Calls trigger with a destination of the voice activated dialing service node 109 and sends an AnalyzedInformation operation 502 to the voice activated dialing service node 109.

Upon receipt of the AnalyzedInformation operation 502, the originating mobile switching center 102 and the voice activated dialing service node 109 set up a service node connection analogously to the message flow 301 (FIG. 3). For example, the voice activated
10 dialing service node 109 sends a ConnectResource message 504 to the originating mobile switching center 102. The ConnectResource message 504 indicates to the originating mobile switching center 102 to setup a temporary connection with the voice activated dialing service node 109. The ConnectResource message 504 comprises a service identification to indicate to the originating mobile switching center 102 that the voice activated dialing service node
15 109 was involved on the call. "ServiceID=5" serves to represent the service identification associated with the voice activated dialing service node 109.

Since the initial trigger response 218 (FIG. 2) armed the CgRAA trigger, upon receipt of the ConnectResource message 504, the originating mobile switching center 102 sends an AnalyzedInformation operation 506 to the prepaid service node 106. For example, the
20 originating mobile switching center 102 encounters a CgRAA trigger and sends the AnalyzedInformation operation 506 to the prepaid service node 106.

The AnalyzedInformation operation 506 communicates to the prepaid service node 106 that a call is being set up to the voice activated dialing service node 109. The AnalyzedInformation operation 506 comprises DestinationDigits so that the prepaid service
25 node 106 may calculate rating for the call to the voice activated dialing service node 109.

The AnalyzedInformation operation 506 passes a service identification (e.g., ServiceID=127) to the prepaid service node 104 to distinguish the intelligent peripheral call from a standard call.

Upon receipt of the AnalyzedInformation operation 506, the prepaid service node 5 104 sends an anlyzd return result message 508 to the originating mobile switching center 102 to allow the call to continue to the voice activated dialing service node 109. The originating mobile switching center 102 will then set up a call 510 to the digits of the voice activated dialing service node 109 specified in the ConnectResource message 504. The voice activated dialing service node 109 will provide a telephone number to the originating mobile switching 10 center 102 based on an inquiry from the user of the prepaid mobile communication device 110. "XXX729" serves to represent the telephone number.

Since the initial trigger response 218 (FIG. 2) armed the OAnswer trigger, after the call 510 is answered, then the originating mobile switching center 102 encounters the OAnswer trigger. The originating mobile switching center 102 sends an OAnswer trigger 15 message 512 to the prepaid service node 106. The OAnswer trigger message 512 communicates to the prepaid service node 106 that the call to the voice activated dialing service node 109 has been answered. The OAnswer trigger message 512 passes the ServiceID=127 to the prepaid service node 106 to distinguish the intelligent peripheral call from a standard call.

20 If additional time is necessary for the connection with the voice activated dialing service node 109, the voice activated dialing service node 109 may send a ResetTimer 514 to the originating mobile switching center 102. The ResetTimer 514 allows another thirty seconds for the connection between the originating mobile switching center 102 and the voice activated dialing service node 109. The ResetTimer 514 comprises a service identification to 25 indicate to the originating mobile switching center 102 that the ResetTimer 514 was activated

for the connection with the voice activated dialing service node 109. "ServiceID=6" serves to represent the service identification associated with the ResetTimer 514 and can also be used to identify an additional service provided to the prepaid mobile communication device 110.

5 The voice activated dialing service node 109 sends a DisconnectResource message 516 to the originating mobile switching center 102. The DisconnectResource message 516 serves to release the connection between the originating mobile switching center 102 and the voice activated dialing service node 109. The DisconnectResource message 516 may comprise one or more service identifications that indicate to the originating mobile switching
10 center 102 services used by the prepaid mobile communication device 110. "ServiceID=7" serves to represent the one or more service identifications.

 Since the initial trigger response 218 (FIG. 2) armed the Odisconnect trigger message 518, upon encountering the Odisconnect trigger message 518, the originating mobile switching center 102 sends the Odisconnect trigger message 518 to the prepaid service node
15 106. The Odisconnect trigger message 518 communicates to the prepaid service node 104 that the call to the voice activated dialing service node 109 has been disconnected. The Odisconnect trigger message 518 passes the ServiceID=127 to the prepaid service node 104 to distinguish the intelligent peripheral call from a standard call.

 The originating mobile switching center 102 includes the service identifications in the
20 Odisconnect trigger message 518 to the prepaid service node 106. The Odisconnect trigger message 518 sends an indication of the services used by the prepaid mobile communication device 110. For example, the Odisconnect trigger message 518 may comprise one or more of ServiceID=127, Service ID=5, ServiceID=6, and ServiceID=7. The prepaid service node 106 employs the service identifications to calculate billing information based on the use of the
25 one or more service nodes 106, 108, and 109 by the prepaid mobile communication device

110. The Odisconnect trigger message 518 may indicate one or more billing parameters, such as, the service identifications, one or more billing rates, and one or more call durations. For example, the Odisconnect trigger message 518 may provide an indication to the prepaid service node 106 of a duration of the connections with the voice activated dialing service node 109. The prepaid service node 106 calculates an amount to deduct from an account balance associated with the prepaid mobile communication device 110.

The prepaid service node 106 sends an Odisconnect return result 520 to the originating mobile switching center 102 to allow the call to continue at the originating mobile switching center 102. In response to the inquiry from the user of the prepaid mobile communication device 110, the voice activated dialing service node 109 sends an analyzed return result message 522 to the originating mobile switching center 102. The analyzed return result message 522 comprises an indication of the telephone number "XXX729". The analyzed return result message 522 closes the transaction started by the AnalyzedInformation operation 502. The analyzed return result message 522 comprises parameters to change the destination digits, thereby redirecting the call to the telephone number "XXX729".

The apparatus 100 in one example comprises a plurality of components such as electronic components, computer hardware components, and/or computer software components. A number of such components can be combined or divided in the apparatus 100. An exemplary component of the apparatus 100 employs and/or comprises a set and/or series of computer instructions written in or implemented with any of a number of programming languages, as will be appreciated by those skilled in the art.

The apparatus 100 in one example employs one or more computer-readable signal-bearing media. One example of a computer-readable signal-bearing medium for the apparatus 100 comprises one or more instances of the recordable data storage medium of one or more of the originating mobile switching center 102, the serving mobile switching center

104, and the service nodes 106, 108 and 109. For example, the recordable data storage medium comprises one or more of a magnetic, electrical, optical, biological, and atomic data storage medium. In another example, a computer-readable signal-bearing medium for the apparatus 100 comprises a modulated carrier signal transmitted over a network comprising or
5 coupled with the apparatus 100, for instance, one or more of a telephone network, a local area network ("LAN"), the internet, and a wireless network.

The steps or operations described herein are just exemplary. The message flows 201 (FIG. 2), 301 (FIG. 3), 401 (FIG. 4), and 501 (FIG. 5) illustrate an exemplary employment of wireless intelligent network ("WIN") signaling. It will be apparent to those skilled in the
10 relevant art that similar functionality can be achieved using protocols, such as Global System for Mobile communications ("GSM")/Customized Applications for Mobile network Enhanced Logic ("CAMEL"), ANSI Capability Set 1 ("CS-1"), International telecommunication union ("ITU-T") CS-1, and session initiation protocol ("SIP"), by variations of the steps and operations without departing from the spirit of the invention. For
15 instance, the steps may be performed in a differing order, with similar operations, or steps may be added, deleted, or modified.

Although exemplary implementations of the invention have been depicted and described in detail herein, it will be apparent to those skilled in the relevant art that various modifications, additions, substitutions, and the like can be made without departing from the
20 spirit of the invention and these are therefore considered to be within the scope of the invention as defined in the following claims.